

a) What is claimed is

CLAIMS

1. A process for the production of esters of unsaturated carboxylic acids with a higher boiling point than water, more particularly acrylic acid or methacrylic acid, and polyhydric alcohols in a reactor (2), the liquid reaction mixture (1) containing polymerization inhibitors and the water of reaction formed being at least partly removed in vaporous form, characterized in that part of the gas/vapour phase of the reaction mixture (1) is removed from the reactor (2) and is partly condensed in a dephlegmator (6), a liquid containing the polymerization inhibitor is introduced into the ascending gas/vapor mixture and the descending condensate from the head of the dephlegmator (6) and the entire outflowing mixture is returned to the reactor (2).
5. mixture (1) containing polymerization inhibitors and the water of reaction formed being at least partly removed in vaporous form, characterized in that part of the gas/vapour phase of the reaction mixture (1) is removed from the reactor (2) and is partly condensed in a dephlegmator (6), a liquid containing the polymerization inhibitor is introduced into the ascending gas/vapor mixture and the descending condensate from the head of the dephlegmator (6) and the entire outflowing mixture is returned to the reactor (2).
10. 2. A process as claimed in claim 1, characterized in that part of the liquid reaction mixture (1) is branched off and introduced into the ascending gas/vapor mixture and the descending condensate.
15. 3. A process as claimed in claims 1 and/or 2, characterized in that the gas/vapor phase removed from the reaction mixture (1) is partly condensed in a dephlegmator (6), a liquid phase enriched with carboxylic acid running off and a water-rich vapor phase leaving the dephlegmator (6) and wetting its inner walls with the liquid containing the polymerization inhibitor.
20. 4. A process as claimed in at least one of claims 1 to 3, characterized in that the liquid containing the polymerization inhibitor has a temperature below or at most up to the reaction temperature.
25. 5. A process as claimed in at least one of claims 1 to 4, characterized in that the condensate is returned to the reactor from above and a liquid containing the polymerization inhibitor, more particularly a part branched off from the liquid reaction mixture (1), is fed to and more particularly sprayed onto the inner walls and internals in the upper part of the reactor (2), more particularly the inner wall of the reactor cover (15).
30. 6. An installation for carrying out the process claimed in at least one of

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claims 1 to 5 comprising a reactor (2) surmounted by a vapor pipe for removing water from the reaction mixture (1), characterized in that it comprises a first pipe (7) extending from the lower part of the reactor (2) to the vapor pipe, first spray nozzles (11) arranged within the vapor pipe at 5 the outlet of the first pipe (7), the spray nozzles (11) being directed in particular oppositely to the ascending vapors, and a pump (9) in the first pipe (7).

7. An installation as claimed in claim 6, characterized in that the vapor pipe is in the form of a dephlegmator (6) surmounting the reactor (2) and 10 the first spray nozzles (11) are directed onto the inner walls of the dephlegmator (6).

8. An installation as claimed in claims 6 and/or 7, characterized in that it comprises a cooler in the first pipe (7).

9. An installation as claimed in at least one of claims 6 to 8, 15 characterized in that a second pipe (12) - either extending from the lower part of the reactor (2) or branched off from the first pipe (7) - is provided and second spray nozzles (14) are arranged at the outlet of the second pipe (12) and are directed onto the inner walls and internals in the upper part of the reactor, more particularly onto the inner wall of the reactor cover 20 (15).

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